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ON THE GENUS CITULA

The genus *Citula* (Cuvier) contains Carangin species (fishes of the sub-family Caranginae) of undoubted close relationship to *Caranx* and *Carangoides*, generally more compressed, approaching somewhat the distorted form seen in *Alectis*, *Selene* and *Vomer*, differing from those species of *Carangoides* which have naked breasts, in the filamentous lobes of vertical fins. It will be remembered that the large genera *Caranx* and *Carangoides* are separated on dentition, which is villiform in the latter. Our American *Citula* (*dorsalis*) has thoroughly villiform dentition and is assuredly nothing more nor less than a specialized *Carangoides*. The type of the genus *Citula* (*armata*), however, has an outer series of somewhat enlarged teeth in the premaxillaries, and perhaps closer relationship with *Caranx*. It would be a reasonable view-point to consider *armata* and *dorsalis* parallel specializations of *Caranx* and *Carangoides* respectively, not related more closely. This would break up the genus *Citula* and make it not worth while to recognize same, its recognition being more or less a matter of convenience anyway; the species are so close to *Caranx* or *Carangoides*. Some of the species of *Citula* (as recognized) would then fall with *Caranx*, some with *Carangoides* and we would have to draw the line separating those two genera between the more specialized as well as the less specialized forms (which would enhance the diffi-

culty of drawing such a line), or lump them all together.

Another view-point is, however, reasonable; namely, that the numerous less specialized members of the group (in body and fin form) have developed differences in dentition separating them into two genera, *Caranx* and *Carangoides*, whereas in the few more specialized ones such differences are less marked and may be given less weight. Probably the actual facts of relationship are complicated and accord exactly with neither view-point. Such being the case, it is the second which is here adopted and Carangin fishes with body compressed, but not extremely so, scales lacking on breast, present on remainder of body, scutes reduced, but present and distinct, teeth usually villiform, lobes of one or both vertical fins filamentous terminally, or extending to peduncle or beyond, and frequently other rays of such fins produced in isolated filaments, are grouped in the genus *Citula*. From a broad evolutionary view-point the genus so characterized is a unit, all its species with so nearly the same inheritance that the probability that a single one will split into divergent lines of development is about as good as that differences already existent will persist and be magnified. To some extent our treatment is open to the criticism of favoring the heresy of multiple origin. As a matter of fact, though accepting the principle of unit origin as sound, and to be well-established as any evolutionary law, we doubt if the facts, if known, would bear it out in every minutest detail.

In the genus *Citula* as so defined we may place the following species:— *Sciaena* [*Citula*] *armata* Forskal, East coast of Africa and the Red Sea to Japan, Australia and New Guinea; *Carangoides altissimus* [*Citula altissima*] Jordan and Seale (Philippines) Philippines and Australia; *Caranx oblongus* [*Citula oblonga*], C. & V., India to Polynesia; *Citula plumbea*, Q. & G. (Isle de France), Isle de France to Samoa; *Caranx* [*Citula*] *mandibularis* Macleay, New

Guinea; *Carangoides* [*Citula*] *chrysophryoides* Bleeker, Sea of Batavia; *Carangoides* [*Citula*] *dinema*, Bleeker, Sea of Batavia; *Carangoides* [*Citula*] *dorsalis*, Gill, Pacific coast of Mexico, Mazatlan to Panama; *Carangoides* [*Citula*] *ophthalmo-taenia*, Bleeker, Amboyna. On the other hand, *Caranx* [*Carangoides*] *humerosus* McCulloch, *Caranx* [*Carangoides*] *gilberti* Jordan and Seale and *Caranx* [*Carangoides*] *deani* Jordan and Seale, with other species in which the vertical fins, though elevated do not reach to the peduncle, should go in *Carangoides*. *Citula halli*, Evermann and Seale, does not belong here, and probably not in the sub-family Caranginae.

Other compressed Carangins with filamentous fins undergo considerable age changes wherein the adult is less specialized, more *Caranx*-like than the young. The American Museum collections contain two specimens of *Citula dorsalis* from the Gulf of California, 80 and 480 mm. to base of caudal, respectively, a comparison of which will give an idea of such changes in that fish. The smaller specimen is deeper (1.6 *versus* 2.1); the keel on top of head more pronounced, extending further back; more compressed (breadth in depth 4.2 *v.* 3.2). Its filamentous dorsal lobe is broken, that of the anal less abruptly filiform and longer, at least to beyond the end of caudal instead of slightly beyond base of same (from anal origin 2.1 *v.* 1.3 times head). The pectoral is less falciform, reaching to the angle of the lateral line instead of well beyond that point (1.0 *v.* 1.3 times head.) The spinous dorsal is well developed in this small individual, whereas in the large one only traces of it remain; the arch of the lateral line about equals straight part in both cases. In the small specimen the head is about the same (3.1 *v.* 3.0 in length), eye larger (3.21½ *versus* 4.7 in head), ventrals longer (1.7 *v.* 3.1 in head). The lower jaw which projects slightly in the small individual is slightly included in the larger, and as is to be expected, the villiform teeth form a compara-

tively narrower band in the smaller (its breadth about 52 v. about 34 in head).

It will be seen from the above that the changes with age in *Citula dorsalis* are comparable with those in more specialized *Alectis*, etc., wherein the young are more extreme than the adult. The statement by Jordan and Evermann (1896, U. S. Nat. Mus., Bull. 47, 1, 929-930) concerning *Citula* (and apparently speaking of *C. dorsalis*):—"The young is more like *Caranx* in form and appearance than the adult, its later development carrying the fish farther in the direction of the extreme forms *Alectis*, *Hynnix* and *Selene*,"—should have been reversed.

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MR. BOULENGER ON THE GENUS *BABINA*.

In an article entitled "*Sur la conformation des phalangettes chez certaines Grenouilles d'Afrique*," published in *Comptes rendus des seances de l'Academie des Sciences*, Vol. 165, pp. 987-990, in 1918, Mr. Boulenger expresses certain opinions regarding *Babina* a genus proposed by me, in 1912, for two species of Dagger-Frogs, *Rana holsti* and *Rana subaspera*, from the Loo Choo Islands. Mr. Boulenger states that *Babina* is based upon a secondary sexual character which will not justify even subgeneric separation from the genus *Rana*. He continues:

"Ce genre *Babina* est fonde sur un caractere sexuel secondaire, le male etant pourvu d'une epine osseuse au pouce (l'extremite du premier metacarpien), percant la peau, epine dont la fonction est assurément la meme que celle des aiguillons cornes et caducs qui arment le doigt interne de certains *Leptodactylus* d'Amerique et qui servent a renforcer l'amplexus pendant l'accouplement, au point qu'on se demande comment la femelle ne succombe pas aux blessures d'une parielle etreinte. Cette epine au pouce de la "grenouille a